

Investigating the Amorphous Form of Black Raspberry Functional Confections on Consumer Acceptance and Confection Disintegration

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INTRODUCTION

We are increasingly learning and understanding the positive effects that bioactives from fruit and vegetable sources have on oral health. In response, functional food systems are being developed to localize the delivery of these anticarcinogenic bioactive compounds.¹ Black raspberries are among the fruits and vegetables that have important bioactive compounds and have demonstrated potent anti-cancer bioactivity, therefore they were the chosen source of preventative bioactives.²⁻⁷

Formulating functional foods that deliver bioactives to target organs is an active area of study with the aim of meeting the challenges of low bioavailability and susceptibility to processing and biological degradation.⁸⁻⁹ Food carbohydrates (starch and pectin) are polymers which form a 3-dimensional food matrix that can entrap, protect and transport bioactive compounds to target delivery sites.¹⁰ The interaction between oral mucosa and bioactive compounds varies based on amorphous state, therefore affecting consumer perceptions of the functional confection. These investigations satisfied the following two objectives:

OBJECTIVE

1. To evaluate consumer acceptance of the various amorphous functional confections based on consumer acceptability scores.
2. To determine the impact of the amorphous forms of black raspberry functional confections on oral exposure (durability) of BRB bioactive compounds.



Pectin Black Raspberry Confections

METHODS

Study Design

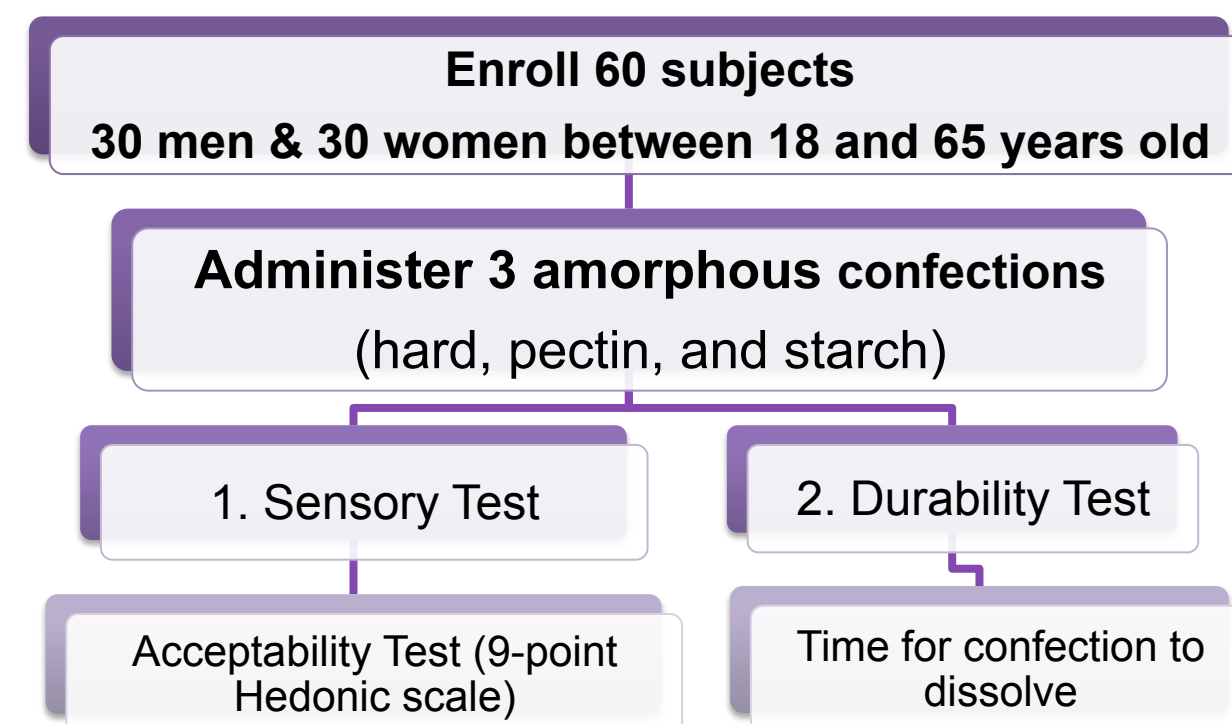


Figure 1: Study design of sensory evaluation and durability test

Sensory Test

Sensory samples were presented in a serial monadic presentation in a clinical setting at the OSU Medical Center Clinical Research Center. Clinical rooms were well lit and participants were provided water and water crackers to rinse their palates in between samples. A 9 point hedonic scale used 1 (dislike extremely) to 9 (like extremely).³

Durability Test

Following the sensory tests, the durability test was conducted. Panelists were instructed not to chew the confection, but tumble it in their mouth until it dissolved. A stopwatch was provided, they asked to record the initial time on the stopwatch that they place the confection in their mouth, then the end time once the confection has fully dissolved.

Statistical Analysis

Consumer acceptance scores (9-point hedonic test) were analyzed in conjunction with residence time of the confection in the oral cavity. Descriptive analysis was generated using Microsoft Excel whereas the statistical evaluation of the consumer acceptance scores was conducted using SPSS 23 (IBM, Armonk, NY) software. Statistical difference ($p \leq 0.05$) among the three confections was discerned using a one way ANOVA (analysis of variance) with Tukey's posthoc test.

RESULTS

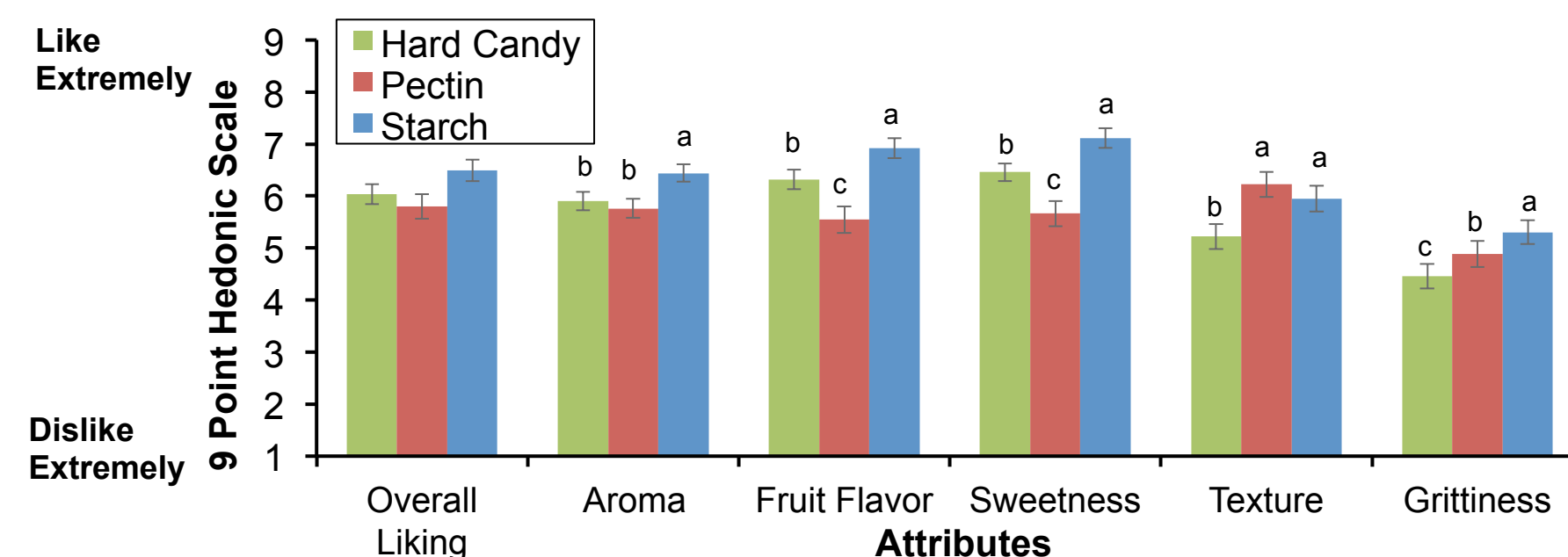


Figure 2: Hedonic overall liking of three amorphous confections. Sensory Evaluation of 3 confections (n=59). Letters denote mean separation where significant differences ($p \leq 0.05$) were found using ANOVA with Tukey's posthoc test.

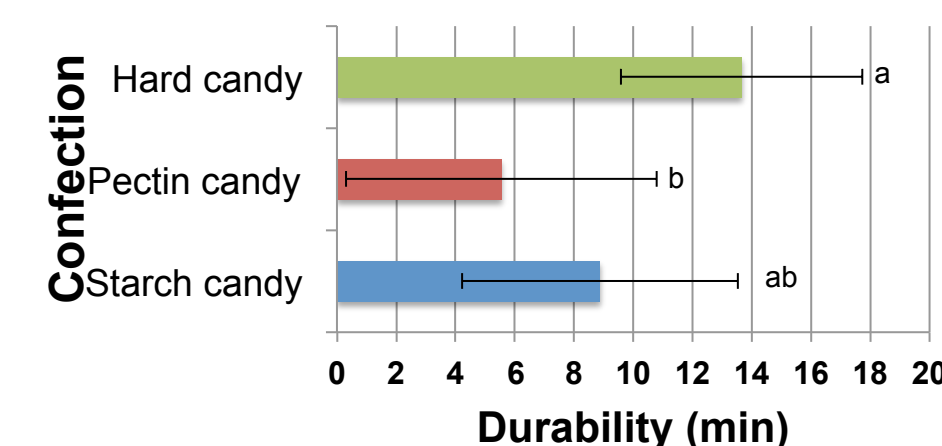


Figure 3: Durability of three amorphous confections. Oral residence time (durability) measured in minutes. Letters denote differences using ANOVA ($p \leq 0.05$) with Tukey's posthoc test.

Table 1. Consumer Confection Consumption Pattern

Consume candy occasionally (3-5 days/week)	22% (13/59)
Like candy very much	42% (25/59)
Consume candies with fruit occasionally (3-5 days/week)	20% (12/59)
Like candies with fruit very much	46% (27/59)
Consume fruit frequently (>7 days/week)	57% (34/59)
Consume berries or food containing them occasionally (3-5 days/week)	73% (43/59)
Like black raspberries very much	52% (31/59)

CONCLUSIONS

Of each of the three confection forms, the starch confection was the most preferred. In terms of acceptability, the starch confection had the highest average overall liking score. The data suggests that consumer acceptance, rather than duration, is important in clinical compliance when selecting a functional confection for future large-scale clinical trials.

ACKNOWLEDGEMENTS

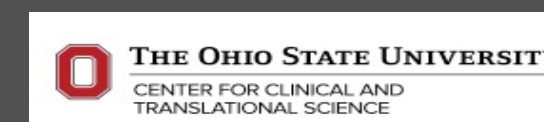
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